

①

NOT ALL COPY

## A RAND NOTE

AD-A220 305

### The Threat of Nuclear Terrorism: A Reexamination

Peter deLeon, Bruce Hoffman,  
with Konrad Kellen, Brian Jenkins

January 1986

DTIC  
ELECTE  
APR 11 1990  
S B D

*40 Years*  
1948-1988  
**RAND**

DISTRIBUTION STATEMENT A  
Approved for public release;  
Distribution Unlimited

90 07

The RAND Publication Series: The Report is the principal publication documenting and transmitting RAND's major research findings and final research results. The RAND Note reports other outputs of sponsored research for general distribution. Publications of The RAND Corporation do not necessarily reflect the opinions or policies of the sponsors of RAND research.

## **A RAND NOTE**

**N-2706**

### **The Threat of Nuclear Terrorism: A Reexamination**

**Peter deLeon, Bruce Hoffman,  
with Konrad Kellen, Brian Jenkins**

**January 1988**

*40 Years*  
1948-1988

**RAND**

## PREFACE

This Note reports the final results of the first phase of a two part study, the purpose of which is to describe the spectrum of capabilities of individuals and groups that could be considered likely to attempt the takeover or theft and misuse of a nuclear weapon over the next 10-15 years.

This Note first analyzes the motivations that might inspire various acts of nuclear terrorism. Second, it reviews the altered contexts that might affect terrorists' decisions to "go nuclear."

The work was carried out in the International Security and Defense Policy Program of the National Security Research Division at RAND, under a project entitled "Adversaries of Nuclear Weapons Facilities."



Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <i>per Form 50</i>	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	

## SUMMARY

This study's primary concern is terrorist attacks against U.S. nuclear weapons systems, at home or abroad, but it also considers terrorist attacks against nuclear power plants, the American nuclear industry, and the nuclear facilities and arsenals of other nations.

Terrorists driven by opposition to nuclear power or nuclear weapons, or seeking to co-opt antinuclear sentiment for their own radical political agenda, might stage a "demonstration" action against a nuclear facility. Such actions as breaking down fences, shooting at a guard, phoning a bomb threat, or lobbing mortars would, of course, interfere with the operations of the facility. But the main intent would be propaganda: to ridicule the plant authorities and, by implication, the government for inadequate security, hence arouse public concern about nuclear safety. Such demonstration attacks by dedicated opponents can probably never be prevented entirely.

At the other end of the scale of potential lethality would be scenarios in which terrorists take over a nuclear facility and threaten to explode a stolen nuclear weapon or device or cause contamination with nuclear material unless specific demands are met. Such hypothetical schemes of nuclear coercion would indeed seem to offer terrorists much greater leverage to extract concessions from governments than have their (often successful) kidnappings, hijackings, and embassy takeovers in the past.

Despite its popularity as a fictional theme, however, no such act of nuclear blackmail has occurred. Why not? First, most terrorist organizations are not particularly innovative. Although radical in their politics, they are conservative in their operations. Moreover, what little innovation there has been was generally in the choice of *targets* and not in either tactics or sophisticated weapons.

Second, the risks associated with stealing and then handling nuclear material would be tremendous, as would the technical expertise required. Few if any terrorists are knowledgeable in nuclear technology, whereas they have mastered the components of "conventional" terrorist attacks. Nuclear coercion appears problematic for them for other reasons. Terrorists, like other blackmailers, are reluctant to mount threats that they are not prepared to execute if their demands are denied. In addition, such massive destruction would cause public revulsion, alienating any potential sympathizers, and trigger severe government retaliation.

However, four recent developments could conceivably affect terrorists' willingness and ability to operate in the nuclear domain:

1. The large and growing number of tactical nuclear devices, including manmobile weapons, that could be targeted for theft, easy concealment, and use.
2. The increasing stocks of plutonium, which can be converted into weapon-grade material, as commercial reactors worldwide convert to the forecast plutonium economy.
3. The emergence of state-sponsored terrorism, enhancing both the resources afforded to terrorist groups and possibly the demand for acts of nuclear terrorism.
4. The recent escalation by some terrorists from attacks against property or limited numbers of specific people to more indiscriminate attacks with large numbers of victims.

Taken in combination, these four altered contexts could make an act of nuclear terrorism somewhat more likely in the years ahead. State sponsorship, in particular, could provide terrorists with the incentives, capabilities, and resources they previously lacked for undertaking such an ambitious operation.

Still, we would not ascribe a high likelihood to major acts of nuclear terrorism. Given the technical difficulties, risks, and possible negative repercussions for them and their state sponsors, few terrorists would be willing to try such a daring tactical innovation. Demonstration attacks (e.g., low-level standoff attacks) still seem somewhat more likely than acts aimed at massive casualties and property damage because they are both more easily motivated politically and more easily accomplished.

While serious acts of nuclear terrorism, especially those involving military targets, remain unlikely in our opinion, certain configurations of groups and conflict situations seem more likely than others to give rise to various types of nuclear terrorism. For example, ethnic/religious fanaticism could more easily allow terrorists to overcome the psychological barriers to mass murder than could a radical political agenda. Even if such a development did not involve or threaten U.S. assets or citizens directly, the United States would view it with the gravest concern because of the dangerous precedent and potential for imitation.

## ACKNOWLEDGMENTS

The authors owe a particular debt of gratitude to Gail Bass Golod, who reviewed an earlier draft of this study. Her detailed comments and suggestions greatly improved the final version. Linda Weiss deserves special praise for typing and retyping successive drafts of this manuscript. Finally, Helen Turin brought her invaluable editorial skills to bear in refining a rather unwieldy manuscript.

## CONTENTS

PREFACE .....	iii
SUMMARY .....	v
ACKNOWLEDGMENTS .....	vii
Section	
I. INTRODUCTION .....	1
II. WHAT MIGHT TERRORISTS DO IN THE NUCLEAR ARENA AND WHY? .....	3
III. THE ALTERED CONTEXTS FOR NUCLEAR TERRORISM .....	7
Growing Number of Weapons Warheads .....	7
The Emergence of a Worldwide Plutonium Economy .....	9
State-Sponsored Terrorism .....	10
Greater Number of Terrorist Victims .....	12
IV. CONCLUSIONS .....	15



## I. INTRODUCTION

The fear has been expressed that terrorists might someday attack nuclear weapons facilities or power plants to acquire a nuclear weapon or nuclear material for use in an act of coercion or destruction. Brian Jenkins articulated the threat in 1975 when he asked "Will Terrorists Go Nuclear?"<sup>1</sup> The question remains open to debate.<sup>2</sup> But the possible consequences of nuclear terrorism are so forbidding as to mandate close attention to the issue. At a June 1985 conference on nuclear terrorism, held in Washington, D.C. by the Nuclear Control Institute, there was scant consensus regarding the probability of a terrorist attack on nuclear facilities or other acts of nuclear terrorism, but there was virtual unanimity concerning the horrific consequences should such an event occur. In the words of the conference's co-sponsors:

Given the potentially cataclysmic consequences of an act of nuclear terrorism, and the chaos that would ensue from even a credible terrorist nuclear threat, a major effort to develop a multidisciplinary strategy for preventing nuclear terrorism would appear to be warranted. However, the popular perception of nuclear terrorism as a high-consequence but low-probability event serves to inhibit such preventive action. Yet inaction may prove perilous; there are no guarantees that the present constraints on terrorist groups will persist indefinitely.<sup>3</sup>

Fortunately, the historical record to date has been benign. With the exception of two minor incidents, in which terrorists temporarily occupied nonoperational nuclear plants in Spain and Argentina, terrorists have not attacked nuclear facilities, stolen nuclear weapons or weapon-grade nuclear materials, nor even committed credible nuclear hoaxes. Still, observers have pointed out that there have been important changes in international terrorist activity, in nuclear weapons, and in the availability of strategic nuclear material that might lessen the constraints that have thus far kept terrorists from entering the nuclear realm.

---

<sup>1</sup>Brian Jenkins, *Will Terrorists Go Nuclear?* California Seminar on Arms Control and Foreign Policy, Santa Monica, 1975.

<sup>2</sup>Compare the testimonies of Brian Jenkins and Paul Leventhal before the U.S. Congress, U.S. House of Representatives, Subcommittees on Arms Control, International Security, and Science, and on International Economic Policy and Trade. Hearings held on July 24, 1985. Hereafter referenced as *Hearings*.

<sup>3</sup>Paul Leventhal and Yonah Alexander, "Introduction," in Paul Leventhal and Yonah Alexander (eds.), *Nuclear Terrorism: Defining the Threat*, Pergamon-Brassey's, New York, 1986, p. 2.

This Note first analyzes the motivations that might inspire various acts of nuclear terrorism. Second, it reviews the altered contexts that might affect terrorists' decisions to "go nuclear." The primary concern of this study is terrorist attacks against U.S. nuclear weapon systems at home or abroad, but it also considers terrorist attacks against nuclear power plants,<sup>4</sup> the American nuclear industry,<sup>5</sup> and the nuclear facilities and arsenals of other nations.

This study aims to inform policymakers responsible for protecting nuclear systems. An immediate caveat is necessary. It is difficult to contribute anything operationally useful to the security of nuclear systems—more specifically nuclear weapon systems or installations—because no attack against such facilities has yet occurred, so there are no "lessons" from past experience. Although various disturbances in or against nuclear plants at home or abroad have taken place, none has endangered any part of their nuclear components, or produced any radioactive fallout. Nor have there ever been any credible threats of sabotage against military or nonmilitary nuclear plants. Therefore, any conclusions regarding possible future terrorist attack on a nuclear weapons site, manufacturing plant, or civilian nuclear installation are speculative. However, speculation informed by extensive research into the motivations, calculations, and operations of foreign and domestic terrorists can be of some assistance in making difficult security decisions in an uncertain environment.

---

<sup>4</sup>A threat detailed in Bennett Ramberg, *Nuclear Power Plants as Weapons for the Enemy: An Unrecognized Military Peril*, University of California Press, Berkeley, 1980.

<sup>5</sup>See Joseph F. Pilat, "Antinuclear Terrorism in the Advanced Industrial West," in Yonah Alexander and Charles K. Ebinger (eds.) *Political Terrorism and Energy: The Threat and Response*, Praeger, New York, 1982.

## II. WHAT MIGHT TERRORISTS DO IN THE NUCLEAR ARENA AND WHY?

The term "nuclear terrorism" encompasses a broad range of possible criminal acts.<sup>1</sup> It includes actions against nuclear facilities, military or civilian, including vehicles transporting nuclear weapons, components, or materials; and those in which nuclear weapons, explosive devices, or materials are used to threaten or actually destroy people and property. The first type of action might serve as a precursor to the second; terrorists might assault or infiltrate a facility to steal a weapon or material for use in a future nuclear threat.

Various strategies and motivations might lead terrorists into the nuclear domain. A broad distinction can be made among acts designed primarily for demonstration or propaganda purposes, acts aimed at coercing concessions from the authorities, and acts of outright destruction. These are not pure types, however, and a given terrorist crime may reflect elements of more than one strategy. All terrorist acts, for example, including acts of nuclear coercion or destruction, have propaganda—the swaying of public opinion—as one of their aims.

Terrorists driven by opposition to nuclear power<sup>2</sup> or nuclear weapons, or seeking to co-opt antinuclear sentiment for their own radical political agenda, might stage a "demonstration" action against a nuclear facility. Such actions as breaking down fences, shooting at a guard, phoning a bomb threat, or lobbing mortars would, of course, interfere with the operations of the facility. But the main intent would be propaganda: to ridicule the plant authorities and, by implication, the government for inadequate security, hence arouse public concern about nuclear safety. Such demonstration attacks by dedicated opponents can probably never be prevented entirely. Terrorists need not even target the nuclear installation itself to publicize their antinuclear message. In West Germany, for example, where there is a large antinuclear faction and indigenous terrorist groups are especially active, terrorists have toppled power lines carrying electricity from nuclear plants to the

---

<sup>1</sup>A more thorough discussion is found in Gail Bass et al., *Motivations and Possible Actions of Potential Criminal Adversaries of U.S. Nuclear Programs*, The RAND Corporation, R-2544-SL, February 1980.

<sup>2</sup>The U.S. civilian nuclear industry is no longer the "growth" industry it once was; many early power reactors will soon be shut down and decommissioned, so there will be fewer nuclear power reactors over the next decade. Consequently, opposition to nuclear power should become a less likely motive for domestic terrorist activity, and terrorists will have fewer targets of opportunity in the nuclear arena.

consumer. This type of attack is consistent with the terrorist's demonstrated preference to select "soft" targets rather than well-defended ones.

At the other end of the scale of potential lethality would be scenarios in which terrorists take over a nuclear facility, threaten to explode a stolen nuclear device, or cause contamination with nuclear material, unless specific demands are met. Such hypothetical schemes of nuclear coercion would indeed seem to offer terrorists much greater leverage to extract concessions from governments than have their (often successful) kidnappings, hijackings, and embassy takeovers in the past.

Despite its popularity as a fictional theme, however, no such act of nuclear blackmail has occurred. Why not? There are several reasons. First, the vast majority of terrorist organizations are not particularly innovative. Radical in their politics, they are conservative in their operations. They seem hesitant to recognize and take advantage of new situations, let alone create new opportunities. In the few cases where terrorists have been somewhat innovative, such as in the hijacking of the Italian cruise ship *Achille Lauro* by Palestinian terrorists in October 1985, the result has been failure. Moreover, the little innovation that has occurred has been in the choice of *targets* and not in either the terrorists' tactics or their use of sophisticated weapons.

Second, the risks associated with stealing and then handling a nuclear weapon or material would be tremendous, as would the technical expertise required. Terrorists are generally not knowledgeable in nuclear technology (e.g., the conversion of stolen plutonium into an explosive device), whereas they have mastered the components of "conventional" terrorist attacks.

Even if terrorists were willing to assume the risks and had the necessary expertise, nuclear coercion appears problematic for them for other reasons. Terrorists, like other blackmailers, are reluctant to mount threats that they are not prepared to execute if their demands are denied. Where terrorists have threatened to execute prominent hostages (for example, Italy's Red Brigades in the kidnapping of former Prime Minister Aldo Moro and West Germany's Red Army Faction in the abduction of wealthy industrialist Hans Martin Schleyer), they have indeed killed their hostages (possibly with some regret) when their demands were not met, for they had to guarantee the credibility of future threats they might make.

Yet following through on the threatened use of a nuclear weapon might, in addition to presenting serious operational challenges, be politically unpalatable for the terrorists. Such massive destruction could be expected to result in public revulsion, alienating any potential sympathizers to their cause, and trigger severe government measures to eliminate the

terrorists. Suppose the targeted government were willing to negotiate on the terrorists' demands. The authorities would undoubtedly demand the surrender of the nuclear potential as a quid pro quo, leaving the terrorists without means of guaranteeing the government's delivery of its promised concessions. (Terrorists who release human hostages are also potentially vulnerable to a government double-cross, but it would be easier to capture new hostages than to steal another nuclear weapon.)

Terrorist actions, of course, are not always explicitly coercive, threatening dire consequences unless their demands are met. Terrorists often carry out bombings, assassinations, and other acts of destruction with no specific prior threats or demands, against targets representing what the terrorists consider "enemy" governments or hated institutions. Sometimes random attacks precede the issuing of demands, as was the case in the bombing rampage in Paris during September 1986 by followers of imprisoned Lebanese terrorist leader Georges Ibrahim Abdullah, seeking his release. And sometimes outright destruction is itself coercive. Witness the Beirut truck-bombing of 1983, which, by killing 240 U.S. Marines, achieved the terrorists' goal of having the United States withdraw its presence in Lebanon.

In the nuclear domain as well, terrorists could use an acquired nuclear weapon to inflict damages without making demands. Such an option, however, would entail the same risks of apparent overkill, public alienation, and undesired government response as would a nuclear blackmail scheme.

In short, "going nuclear" presents even highly committed terrorists with serious operational and political problems. As already noted, there have as yet been no known incidents of serious nuclear crimes or terrorism.<sup>3</sup> What few nuclear crimes appear in the public record have been for personal economic gain or might be considered "nuclear mischief." Even violent demonstrations against nuclear power plants or weapons have not led to acts of nuclear terrorism, either in the United States or abroad.<sup>4</sup> Furthermore, to the

---

<sup>3</sup>The historical record is so slim that policy researchers have been forced to employ an "analog" methodology to assess and evaluate threats to nuclear facilities. See Peter deLeon et al., *Attributes of Potential Criminal Adversaries of U.S. Nuclear Programs*, The RAND Corporation, R-2225-SL, February 1978; Bass et al., 1980, and Bruce Hoffman and Peter deLeon et al., *A Reassessment of Potential Adversaries to U.S. Nuclear Programs*, The RAND Corporation, R-3363-DOE, March 1986, for discussions and examples of the analog approach. While not without its problems, this approach has been widely adopted; e.g., N. E. Wagner, *A Survey of Threat Studies Relating to the Nuclear Power Industry*, Sandia Laboratories, Albuquerque, 1977.

<sup>4</sup>See Victoria L. Daubert and Sue Ellen Moran, *Origins, Goals, and Tactics of the U.S. Anti-Nuclear Protest Movement*, The RAND Corporation, N-2192-SL, March 1985.

best of our knowledge, there is *no* record of any nuclear crimes having been committed against U.S. military installations, including the attempted theft of nuclear weapons.

Nonetheless, it cannot be assumed that what has not happened in the past will not happen in the future. Several recent developments could conceivably affect terrorists' willingness and ability to operate in the nuclear domain.

### III. THE ALTERED CONTEXTS FOR NUCLEAR TERRORISM

Most observers agree that there are four important new elements that could affect both the terrorists' view of the nuclear arena and their access to it:

1. The large and growing number of tactical nuclear devices, including manmobile weapons, that could be targeted for theft, easy concealment, and use.
2. The increasing stocks of plutonium, which can be converted into weapon-grade material, as commercial reactors worldwide convert to the forecast plutonium economy.
3. The emergence of state-sponsored terrorism, enhancing both the resources afforded to terrorist groups and possibly the demand for acts of nuclear terrorism.
4. The recent escalation by some terrorists from attacks against property or limited numbers of specific people, to more indiscriminate attacks with large numbers of victims.

#### GROWING NUMBER OF WEAPONS WARHEADS

For the past decade, U.S. defense strategies have moved toward the concepts of flexible response and protracted conflicts, and the ability to fight limited nuclear conflicts. This has produced a marked change in the composition of the American nuclear arsenal, from high-yield kiloton strategic nuclear warheads to lower yield, more tactical nuclear warheads.<sup>1</sup> Fifty-eight pound, man-portable devices are reputed to be part of the U.S. nuclear quiver.<sup>2</sup> This has resulted in a greater number of smaller nuclear warheads, which may encourage terrorists to attempt to steal them and make it easier for them to do so.

Some terrorists have apparently already given serious thought to the theft of U.S. nuclear devices. U.S. Senator Jeremiah Denton has disclosed that the Italian Red Brigade members who kidnapped Brigadier General James Dozier in 1981 actively questioned him on the location of U.S. nuclear weapons in Europe. Moreover, Denton claims that

---

<sup>1</sup>As were thoroughly enumerated by Thomas B. Cochran et al., *Nuclear Weapons Databook, Vol. 1: U.S. Nuclear Forces and Capabilities*, Ballinger, Cambridge, Mass., 1984.

<sup>2</sup>Cited by Thomas D. Davies, "What Nuclear Means and Targets Might Terrorists Find Attractive?" in Leventhal and Alexander, 1986, p. 58.

"members of Germany's Red Army Faction have been apprehended with maps and drawings of nuclear storage sites and security patrol routes."<sup>3</sup>

Concern has been expressed in recent years about the adequacy of current security measures for nuclear weapon systems. Congressional hearings have questioned the efficacy of the locations and protection measures for such devices, even though they are highly classified.<sup>4</sup> Permissive Action Links (PALs), devices designed to prevent the accidental or unauthorized explosion of nuclear warheads, have become increasingly sophisticated and difficult to circumvent.<sup>5</sup> However, like any other mechanical device, they can be defeated with knowledge, skill, and time. Moreover, there is some evidence that not all U.S. nuclear warheads (e.g., those on some Navy vessels) are PAL-equipped.<sup>6</sup>

The proliferation of nuclear weapons to nations beyond the current six would expand the number of opportunities for theft open to potential nuclear terrorists. The gravity of this situation would be worsened should the new nuclear nations not have the protective technology, political stability, or means to institute and maintain adequate safeguard measures.<sup>7</sup>

Even without new entrants to the "nuclear club" an increasing amount of highly sensitive information in the public domain details the development and fabrication of nuclear weapons materials as well as the locations of fabrication plants, and could be exploited by potential nuclear terrorists.<sup>8</sup> In sum, the growing number of nuclear warheads, their greater maneuverability, the easier access to sensitive information, and the possible introduction of nuclear weapons to less secure environments could provide the highly motivated terrorist with an enlarged "window of opportunity" for nuclear theft.

---

<sup>3</sup>Jeremiah Denton, "International Terrorism—The Nuclear Dimension," in Leventhal and Alexander, 1986, pp. 152-153.

<sup>4</sup>For example, U.S. House of Representatives, Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, *Nuclear Security Coverup*, 89th Cong., 2d Sess., Washington, D.C., February 1984.

<sup>5</sup>PALs are described in Cochran et al., 1984; and Dan Caldwell, "Permissive Action Links: A Description and Proposal," *Survival*, Vol. 29, No. 3, May/June 1987, pp. 224-238.

<sup>6</sup>Lawrence Meyer, "AF Locks System Used for Many Nuclear Missiles," *Los Angeles Times*, October 14, 1984, p. 28.

<sup>7</sup>See Leonard S. Spector, "The Nuclear Netherworld," *The New Nuclear Nations*, Vintage Books, New York, 1985, especially Ch. 2.

<sup>8</sup>See, for example, Thomas B. Cochran et al., *Nuclear Weapons Databook, Vol. II: U.S. Nuclear Warhead Production*, and *Vol. III: U.S. Nuclear Warhead Facility Profiles*, both Ballinger, Cambridge, Mass., 1987. An advertisement notes that the latter lists "all twenty-five U.S. facilities used to produce nuclear warheads. Each profile includes location, size, employment, budget, scientific facilities, history, and function."



## THE EMERGENCE OF A WORLDWIDE PLUTONIUM ECONOMY

The worldwide commercial nuclear power industry could move to a plutonium-based fuel cycle within the next decade or two.<sup>9</sup> Experts disagree on the imminence, certainty, and magnitude of this transition. Krazner estimates that the amount of reprocessed plutonium (PU) in the year 2000 will be 336 metric tons; the 1978 International Nuclear Fuel Cycle Evaluation (INCFE) study projected approximately 885 metric tons; and Albright estimates close to 1400 metric tons.<sup>10</sup> What seems far more certain, however, is that the U.S. share of the nuclear fuels supply market is diminishing from 100 percent of the world market in 1972 to a forecast 25 percent in 1995.<sup>11</sup> That is, the United States can no longer control the world's supply of plutonium or enriched uranium nor, more pertinent to the possibility of nuclear terrorism, prevent its growth. In the words of Ambassador-at-Large Richard T. Kennedy:

The day is long past when the United States could unilaterally dictate the terms and conditions of international nuclear commerce. We no longer enjoy a monopoly over nuclear technology and the ability to supply or deny it as suits our interest. We are not even close to enjoying this privileged position any more.<sup>12</sup>

The relevance of this trend to the potential nuclear terrorist is apparent. Should PU become the predominant nuclear fuel and reprocessing become commonplace, the world's supply of PU will vastly increase. If one assumes that stolen or diverted PU can be converted to nuclear explosive, the threat of nuclear terrorism could increase substantially.<sup>13</sup>

---

<sup>9</sup>See Walter Patterson, *The Plutonium Business*, Sierra Club Books, San Francisco, 1984; and, for a brief statement, Paul Leventhal, testimony, *Hearings*, 1985.

<sup>10</sup>All of these estimated projections represent vested interests. Morton B. Krazner, *Prior Consent and Nuclear Cooperation*, Atomic Industrial Forum, Inc., Bethesda, June 1983, p. 4. INCFE figures cited in Patterson, 1984, p. 157. Albright, *Hearings*, 1985. Patterson himself calculates 600 metric tons of separated PU, p. 157. For detailed estimates, see David Albright, "World Inventories of Plutonium," in Leventhal and Alexander, 1986, App. A.

<sup>11</sup>This is documented in the testimony of Harold D. Bengelsdorf, Vice President of International Energy Associates, *Hearings*, 12 June 1985.

<sup>12</sup>Testimony before Congress in *Hearings*, 1985.

<sup>13</sup>Certainly not an implausible assumption; see General Accounting Office, *Nuclear Fuel Reprocessing and the Problems of Safeguarding Against the Spread of Nuclear Weapons*, Washington, D.C., EMD-80-38, March 18, 1980. Highly enriched uranium is better than PU for improvised nuclear bombs because it can be used in less sophisticated detonating devices.

However, the limitations on U.S. PU reprocessing imposed by Presidents Ford and Carter, as well as the high costs of plutonium facilities relative to uranium fuel cycles, have thus far made the transition to a PU economy problematic at best.<sup>14</sup> Even if the commercial nuclear power industry should become plutonium-based, the notion that civilian nuclear power facilities would lead automatically and irrevocably to nuclear weapons, and thence to a greater danger of nuclear terrorism, is an unproven assumption.<sup>15</sup> PU reprocessing is extremely hazardous, as is the handling of weapon-grade plutonium.<sup>16</sup> For the terrorist improvising a nuclear bomb, highly enriched uranium would be preferable to PU, since it can be used in less sophisticated nuclear devices.

Of course, terrorists would not necessarily have to obtain weapon-grade quality PU or a critical mass to threaten or ultimately wreak incredible damage. If they announce their possession of PU with sufficient credibility to arouse public hysteria, they would have immense leverage to secure their demands. The reputed July 1985 threat to contaminate New York City's water supply with PU underscores this frightful potential.<sup>17</sup>

#### STATE-SPONSORED TERRORISM

Perhaps the most important change in terrorism during the past decade has been the emergence of state-sponsored terrorism—the use of terrorism by sovereign nations as a deliberate instrument of policy.<sup>18</sup> Jenkins refers to this condition as one of “surrogate warfare,”<sup>19</sup> a perspective supported by evidence that terrorist acts against U.S. citizens and

---

<sup>14</sup>See Brian Chow, “The High Risk and High Price of Plutonium,” *Wall Street Journal*, August 6, 1982, p. 14; and Patterson, 1984.

<sup>15</sup>An ongoing and yet unresolved debate: Compare John P. Holdren, “Nuclear Power and Nuclear Weapons: The Connection Is Dangerous,” *Bulletin of the Atomic Scientists*, Vol. 39, No. 1, January 1983, pp. 40-45, with Peter deLeon, “Nuclear Power and Nuclear Weapons: The Tenuous Link,” *Comparative Strategy*, Vol. 3, No. 1, Spring 1981, pp. 45-68.

<sup>16</sup>What constitutes weapon-grade plutonium is uncertain. See Justin L. Bloom, *Plutonium Grade and the Risk of Nuclear Weapons Proliferation: A Review of Thinking on a Troublesome Subject*, Library of Congress, Congressional Research Service, Report No. 85-145 S, Washington, D.C., August 1985.

<sup>17</sup>Joyce Puranick, “How Koch and Aides Handled the Plutonium Threat,” *New York Times*, July 29, 1985; and Malcolm W. Browne, “Limitations of Plutonium Tests Cited,” *New York Times*, July 30, 1985.

<sup>18</sup>Documented by Bruce Hoffman et al., *A Reassessment of Potential Adversaries to U.S. Nuclear Programs*, The RAND Corporation, R-3363-DOE, March 1986. See also Davies, in Leventhal and Alexander, 1986.

<sup>19</sup>Brian M. Jenkins, “Defense Against Terrorism,” *Political Science Quarterly*, Vol. 101, No. 5, 1986, p. 778; and, Brian Jenkins, *International Terrorism: The Other World War*, The RAND Corporation, R-3302-AF, November 1985.

property (as well as those of other countries) have been ordered and abetted by leaders of other governments. In addition to the increase in state-sponsored terrorist attacks, there are growing links and cooperation among international terrorist groups, especially in terms of shared intelligence.<sup>20</sup> These new phenomena suggest strategies, tactics, and most of all assets or resources unavailable to earlier terrorist generations.

Nevertheless, an act of nuclear terrorism is something that not even a state employing terrorists as surrogates would be likely to undertake lightly, given the prospects of harsh reprisals. Robert Oakley, former Ambassador-at-Large for Counter-Terrorism at the Department of State, has detailed a list of terrorist provocations and appropriate and likely U.S. responses;<sup>21</sup> Secretary of State George Shultz has publicly warned of American military action in response to terrorist acts even "before each and every fact is known or on evidence that would not stand up in an American court."<sup>22</sup> Following the attacks staged by terrorists belonging to the Abu Nidal group on the Rome and Vienna airports in December 1985, President Reagan bluntly warned: "By providing material support to terrorist groups which attack U.S. citizens, Libya has engaged in armed aggression against the United States under established principles of international law, just as if he [Libyan leader Muammar al-Qaddafi] has used its own armed forces."<sup>23</sup> And, of course, the U.S. Air Force bombing of Libya in April 1986 illustrates that American responses to terrorists' provocations are not mere rhetoric.<sup>24</sup> As Secretary Shultz has cautioned, it is "increasingly doubtful that a purely passive strategy can even begin to cope with the problem."<sup>25</sup>

In this environment, terrorist attacks against American nuclear facilities become more plausible for at least two reasons. First, whereas terrorist groups previously might have had little reason to risk an attack on a nuclear facility to steal weapons or materials they could not easily use, a national leader might now decide to employ a terrorist group to acquire a

---

<sup>20</sup>See Thomas L. Friedman, "Loose-Linked Network of Terror: Separate Acts, Ideological Bonds," *New York Times*, April 28, 1986, pp. A-1, A-6.

<sup>21</sup>Robert Oakley, "International Terrorism," *Foreign Affairs*, Vol. 65, No. 3, 1987, pp. 611-629.

<sup>22</sup>George P. Shultz, "Terrorism and the Modern World," address at Park Avenue Synagogue, New York, October 25, 1984; also see George P. Shultz, "U.S. Government and Business: Our Common Defense Against Terrorism," address before American Society for Industrial Security, Arlington, Virginia, February 1985.

<sup>23</sup>President Reagan is quoted by the Legal Adviser to the U.S. Department of State, Abraham D. Sofaer, "Terrorism and the Law," *Foreign Affairs*, Vol. 64, No. 5, Summer 1986, p. 921.

<sup>24</sup>U.S. objectives in the Tripoli raid are examined by Seymour M. Hersh, "Target Qaddafi," *New York Times Magazine*, February 22, 1987.

<sup>25</sup>George P. Shultz, speech before the Tri-Lateral Commission, April 3, 1984.

nuclear capability for his own purposes. Libya's Qaddafi has long been rumored to be in the nuclear weapon market and would presumably have few compunctions as to how the components were acquired.<sup>26</sup> Second, a state sponsor could provide a terrorist group access to the resources needed for an ambitious act of nuclear terrorism: technical expertise, training, logistical support, intelligence assistance, sanctuaries, and so on.

The potential for a state-sponsored act of nuclear terrorism could be heightened by the proliferation of nuclear weapons. For example, the rumored Pakistani acquisition of nuclear weapons<sup>27</sup> could provide a state-sponsored terrorist group with a less-protected target than it could hope for in the United States, the Soviet Union, or the other confirmed nuclear powers. Although the theft might not occur from American stockpiles, a stolen nuclear capability could be used in a terrorist attack against U.S. citizens or property abroad. As the historical record has repeatedly shown, terrorist acts ignore international boundaries, and American properties and personnel outside of the United States have been targeted and attacked much more often than those in the United States itself.

Given the strength of past retaliations for major "conventional" terrorist attacks, such as the French air strike against the Shia terrorist base in Baalbek in 1983 and the U.S. bombing raid of Libya in 1986, the massive retaliation that could be expected in response to a state-sponsored act of nuclear terrorism should make even the most radical government contemplate such an adventure with the utmost caution.

#### **GREATER NUMBER OF TERRORIST VICTIMS**

For years, international terrorism has been characterized by its attacks on a limited number of individuals.<sup>28</sup> Even though terrorists had the capability to inflict large numbers of casualties with bombs in public areas, they rarely did or even attempted to do so. Terrorists seem to act under self-imposed restraints. Apparently, they believe that mass, indiscriminate murder would alienate the very audience they wish to recruit or at least influence. Moreover, terrorists have generally been able to achieve publicity and other objectives they desire through relatively less horrendous acts of violence, without inflicting

---

<sup>26</sup>See Spector, 1985, *passim*.

<sup>27</sup>Mark Crawford, "Pakistan Thought to Possess Atomic Bomb," *Science*, Vol. 235, No. 4793, March 23, 1987, p. 1131; and Rod Nordland, "A Pakistan Bombshell," *Newsweek*, March 16, 1987, p. 45.

<sup>28</sup>Brian M. Jenkins, "Is Nuclear Terrorism Plausible?" in Leventhal and Alexander 1986, p. 29, lists the "handful of incidents . . . [that] have occurred since the beginning of the century" in which over 100 people have been killed.

widespread casualties and, not coincidentally, taking fewer risks themselves. As Jenkins observes:

Most terrorists adhere to the principle of the "minimum force necessary," that is, they try to apply just enough violence to achieve their tactical objectives—to be heard, to frighten, to persuade—without alienating perceived constituents, provoking too much public revulsion, or unleashing a government reaction that they may not survive. It is a peculiar characteristic of the terrorist mindset that violence is regarded as something that can be predetermined and precisely regulated.<sup>29</sup>

In this sense, most terrorists are actually calculating political operators rather than the irrational crazies depicted in so much of the popular literature.

Recently, however, these restraints seem to have been relaxed somewhat. In 1985, Sikh terrorists planted a bomb on an Air India Boeing 747, which exploded while the plane was over the Irish Sea killing all 329 persons on board. Another tragic in-air bombing by the same group was barely averted when the bomb was discovered before the Air India plane took off. In October 1983, Middle East terrorists drove an explosive-laden truck into an American military barracks in Beirut, killing over 240 U.S. Marines; the same day, over 50 French soldiers stationed nearby were killed in a similar attack.

Reasons for this apparent escalation are far from certain. Ironically, one explanation might be the success of the international community against terrorism: Heightened security measures have made earlier terrorist tactics, such as embassy takeovers and airline hijackings, more difficult to accomplish. Nor is public attention so readily claimed as it once was. Therefore, terrorists have been forced to move to more spectacular and, unfortunately, bloodier targets in order to achieve the same effect. Another explanation might be that some terrorists now have access to greater resources and thus the ability to mount increasingly more destructive attacks. The Beirut bombing, for example, is said by some munitions experts to be the largest nonnuclear device ever exploded.

Whether these recent large-scale terrorist attacks represent the beginning of a trend or mere statistical outliers is difficult to say. If the constraints, self-imposed and otherwise, on the commission of mass murder continue to erode, actions involving nuclear material or weapons could become more attractive to some terrorist groups. But very large numbers of people can be killed with conventional explosives, and the detonation of even the smallest nuclear device would constitute an enormous leap in destructive potential.

---

<sup>29</sup>Jenkins, R-3302-AF, 1985, p. 23.

In general, terrorists have kept their threats "realistic" (in the sense that they can and will carry these threats out if denied their objectives) and approximately commensurate with the demands made. It is still difficult to imagine a terrorist objective on a scale to warrant a threat against a nuclear facility or the use of stolen nuclear components. Either of these could result in unprecedented numbers of casualties and damage, with the attendant undesired (by the terrorists) implications for public opinion and government reaction.

Paradoxically, should the worldwide fight against terrorism prove successful in frustrating terrorists in their usual activities, the temptation for them to move into the nuclear domain might increase. No longer able to operate effectively and gain their objectives with lesser threats and actions, some fanatical groups, instead of meekly abandoning the field, might make a last-ditch effort to escalate to nuclear blackmail or inflict nuclear damage.

#### IV. CONCLUSIONS

To date there has been no serious incident of nuclear terrorism. The constraints, both self-imposed and external, against terrorists' "going nuclear" have apparently been stronger than the attractions toward such involvement.

The four altered contexts for nuclear terrorism discussed in the previous section, *taken in combination*, could make an act of nuclear terrorism somewhat more likely in the years ahead. State sponsorship, in particular, could provide terrorists with the incentives, capabilities, and resources they previously lacked for undertaking an ambitious operation in the nuclear domain. And, with the possibility of greater accessibility of plutonium or smaller nuclear weapons, nuclear terrorism schemes become less far-fetched than they once seemed.

Still, we would not ascribe a high likelihood to major acts of nuclear terrorism. Given the technical difficulties, risks, and possible negative repercussions for them—and their state sponsors—few terrorists should be willing to try such a daring tactical innovation. Demonstration attacks (e.g., low-level standoff attacks) seem somewhat more likely than acts aimed at massive casualties and property damage because they are both more easily motivated politically and more easily accomplished.

The complete absence thus far of nuclear crimes against military targets is noteworthy. Terrorists have apparently viewed militarily-protected nuclear targets as too heavily guarded to penetrate. They have consistently pursued their objectives through less risky actions. With the advent of smaller and more mobile missiles, both the reality and the appearance of tight military security must be maintained at all stages of production, storage, and transport, to continue to dissuade terrorists from venturing to attack such targets.

While serious acts of nuclear terrorism, especially those involving military targets, remain rather unlikely in our opinion, certain configurations of terrorist groups and conflict situations seem more likely than others to give rise to various types of nuclear terrorism. For example, ethnic/religious fanaticism could more easily allow terrorists to overcome the psychological barriers to mass murder than could a radical political agenda; witness the previously cited bombings of the U.S. and French military barracks in Beirut and the Sikh airplane bombing. A terrorist group of religious zealots, with state support, in a context of ongoing violence (e.g., Lebanon, the Iran-Iraq War) could see the acquisition of a nuclear capability as a viable option. Even if such a development did not involve or threaten U.S.

assets or citizens directly, the United States should view it with the gravest concern because of the dangerous precedent that could be set and the potential for imitation by other terrorist groups.

The Italian Red Brigades and the German Red Army Faction have already evinced interest in the location of nuclear weapons depots. Some European terrorist group might read antinuclear weapons and anti-U.S. sentiments in its environment as sufficiently supportive to attempt an attack against a U.S. weapons facility. Terrorists would consider the successful theft of a nuclear device so embarrassing to American defenders that it would be a valuable propaganda coup even if they never intended to use it.

Fuller elaboration of these and similar nuclear terrorism scenarios, assessing both the plausibility of terrorist attempts and the feasibility of their success, would be an appropriate focus for future research efforts in this field.